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Operators'

Hand Book

A Book
of
Practical
Hints
and
Instruction
for the
Owner
and
Operator

By
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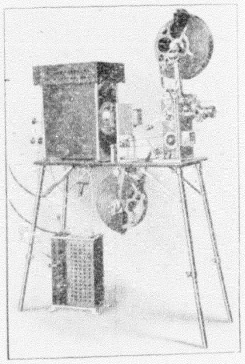

Viascope Special

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Operators' Hand Book

Practical Instruction to Operators

There are a few rules which the good operator will scrupulously observe and keep inviolate. That one who breaks any one of them is doing neither himself or his employer full justice:

(a) Be in the operating room in ample time to have everything in readiness to start when your cue comes—not **"nearly ready,"** but **ready.**

(b) Never, under any circumstances, smoke while working around the machine. If you must smoke between shows, **don't take the pipe or cigar up** until all is ready for the run, and **lay it down the instant you start.** Better not smoke in the operating room at all, though.

(c) Keep your machine clean and **in perfect adjustment.** Also keep the operating room neat. Have a place for everything and everything in its place. Oftentimes an operator will, when an accident occurs (as they will to the best), and an audience is waiting, spend more time hunting for what he needs to make repairs than is required to make the repair itself.

(d) **Give your whole attention to your work while working.**

(e) Allow no "visiting" in the operating room. Don't let any one, not even the boss, talk to you while machine is running. **The machine needs your attention—not part of it, but all.**

(f) **Don't "know it all."** Those who imagine they do are too good for this world. Be eager and willing to learn. There is no man living who knows all there is to know about operating—or anything else, for that matter. The man who thinks he does is making a colossal blunder and one that will cost him dearly in the end. Circulate among the boys and exchange ideas. What they learn from **you won't injure you** and the points you get from them will be clear gain. Don't be afraid to ask questions concerning anything you may not clearly understand. It is better to expose your ignorance and get wise than to have to hide it all your life, isn't it?

THE OPERATING ROOM.

The operating room should be large enough to allow the placing of a small work bench against the wall, preferably on the operating side of the machine, leaving at least three feet clear space on both sides of and behind the machine. There should be at least one window immediately behind the machine, arranged **to open for ventilation** in summer. Place plenty of hooks on the wall. **Have a pail of water and** some soap handy and plenty of soft, clean rags. Duplicate parts it is deemed advisable to carry (see "Extras") should be arranged on the wall hooks or where they will be at hand instantly. Some copper wire of different sizes should be neatly coiled and hung up, too. You cannot tell when it will be needed. On the wall should be a case containing at least a dozen good-sized "pigeon holes," this to contain carbons, extra slides, small machine parts, condenser lenses, tint-slides, etc., etc. Over the bench, where they may be reached from the operating chair, should be hung pliers (with tape-wound handles), screwdrivers of at least three sizes, files, a wood rasp (see "Carbons"), film shears, etc., etc. The "peep-hole" should **be of size and position to allow a good, clear view of the picture** while seated in ordinary operating position. This is important, since if it be made hard for the operator to watch the picture he won't be likely to do it so well, and unless he does there will not be a perfect picture—you may bet on that. Common humanity demands the installation of an electric fan in the operating room in summer. If first-class work is desired, some attention should be paid to the operator's comfort. A man cannot and will not do his best with sweat dripping from his finger tips and the end of his nose, especially when he well knows the expenditure of a few dollars would stop it. The employer has a right to, and should, demand good work; but the employe also has certain rights, among which may be named good tools to work with and such degree of personal comfort as circumstances will permit. If your operating room floor is covered with iron, a rubber mat should be laid on operating side of machine. Heavy linoleum answers the purpose very well.

THE CURTAIN.

Plain, white plaster makes the very best curtain possible. If cloth be used, stretch it perfectly smooth and tight. Sheet metal may be used by tacking the joints down tight, covering them with white lead putty paste. Paint the metal with zinc or white lead, mixed about one-third boiled linseed oil and two-thirds turpentine, adding just a bare tinge of blue. White calsomine is better, but likely to peel on metal. The curtain size depends, of course, on your own desire in that direction, but it is well to have it just the width of picture. Curtain should be framed with neat molding in all cases.

THE CURRENT.

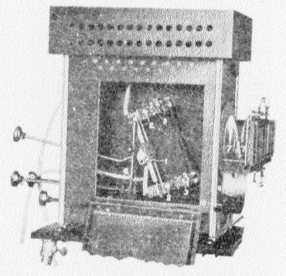
There are two kinds—direct and alternating (the former being far the best for projection purposes), and many minor variations of the two; 110-volt direct is ideal for projection purposes. On taking a new job, the operator should at once ascertain what current he is handling. If alternating, determine voltage and cycle of current. The strength of your light depends not on voltage, but on number of amperes you use. There is, however, a very decided limit to amount one may use to advantage, since if you go too high the light will be difficult to control. Too strong a light is even worse than one too weak. There have been cases where operators claimed to have used as much as sixty amperes to advantage, but the writer has always doubted this. Forty-five, or, at most, fifty amperes is about the practical limit. More lamps are running with thirty-five to forty amperes than with higher number. Ascertaining accurately the exact quantity being used in any given case involves so much trouble that few care to take it. Small ammeters are notoriously unreliable, and figuring out rheostat resistance is beyond the average operator, even if he knew the exact resistance of the wire his particular rheostat contained. The best rule to follow is, begin with weak current and keep cutting in more until you get a clear, brilliant picture (see "Picture"). To handle projection current successfully one **must have a fair knowledge of electricity, backed up by practical experience,** each item being of equal importance (see "Lamp" and "Carbons").

WIRING.

Don't have your wires too small. Wires should invariably be of size to carry the current without any heating at all. It is mistaken economy to equip your plant with wire that even gets warm in use. Aside from danger of fire, wire constantly deteriorates from heating, and before long will not carry the current at all—that is, in sufficient quantity. **Keep all connections clean and tight.** Never make a wire splice without first scraping the ends to be joined until they shine. Wire joints should always be soldered, though they may be used temporarily without if properly made. In making a wire joint, after cleaning ends thoroughly, be **certain to wrap them tightly together.** A loosely made joint will heat. After making joint, always wrap well with insulating tape. **Never leave a raw wire exposed.** There should be a main house-switch and an operating-room switch. From main house-switch to operating-room switch the wires run (through fuses) direct. From operating switch to lamp one wire runs (through fuses) direct, the other running from switch to either binding post of rheostat, and from other binding post to lamp. With alternating current it matters not which wire connects to top or bottom of lamp, but **with direct current this is very important.** With direct current make your connections up to the lamp, then, turning on current, place ends of both wires in a pail of water, being very careful they do not touch each other, and bring them near enough together so that bubbles will pass from one to the other. The wire from which the bubbles pass is the negative and should be attached to the lower binding post of lamp, and the other to the upper. Properly the negative wire should contain the rheostat, though this is not of importance. Another way is to go ahead and connect up the lamp and light it. If crater forms on lower carbon, you have it wrong and must reverse the wires. No damage is done by making the test connection wrong, but you could not use the lamp connected that way.

FUSES.

It is a mistake to run with operating-switch fuses just large enough to carry the current. So long as they are small enough to blow before the main-line fuse goes they are all right, as there is nothing about the lamp that a momentary excess of current will injure in the least. Under ordinary circumstances fifty-ampere fuses are about right for operating room. There is no sense in all the time blowing fuses. As to kind of fuse to use, it is simply



Viascope Lamp House

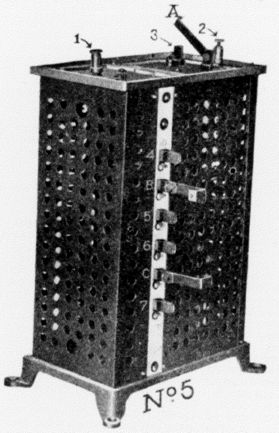
a matter of individual preference. A plain piece of fuse wire will serve every purpose of the more costly patented fuse, and, if properly insulated, serve it just as well, though more troublesome to put in.

THE LAMPHOUSE.

There is little can be said on this subject. The style one likes, another doesn't. In general the essential feature of a good lamphouse is good ventilation (though some operators object), with top screen coarse enough to not readily clog with carbon ash. Size will depend on use. If on road, a small one is desirable, but for stationary work the writer prefers one of ample proportions. The lamphouse should be thoroughly insulated from film box (if one is used) by thick asbestos board. See to it that where wires enter the holes are protected by porcelain insulators fastened securely in place, but easily removable. The laws of most cities require a spring on lamphouse door, but they are only a nuisance to the operator. Unless spring is required by law, simply have a good latch on door and keep door shut when lamp is burning. **Keep the lamphouse clean.** Once a week, if used every day, when you clean lamp and condenser (see "Lamp" and "Condenser"), remove it from base, take out doors and clean thoroughly, particularly the perforated screen at top, if it has one. Oil slide rods occasionally with vaseline.

THE LAMP.

In general, a LAMP should possess the following points of excellence to receive your approval: Simplicity, good mechanical construction, few parts, strength, perfect insulation of carbon holder arms in such form as will not be likely to readily become injured, plenty of adjustment up, down and sidewise, and good, true carbon-grips, with clamp screws that will not be eternally bending or twisting off. **Take your lamp out once a week** (if used every day) **and clean it thoroughly.** Take it all apart, removing all screws from their holes. After cleaning all parts **thoroughly, oil with vaseline**, in which has been mixed ground mica or graphite, wiping clean afterwards. Look well to the wire ends where they join lamp. **Clean them thoroughly.** Much trouble is caused by poor, dirty connections here. To make good electrical contact a wire **must be scraped perfectly clean—until it shines.** These particular connections are subjected to heat anyhow, and if poorly made the heating will be largely increased, with resultant cutting down of current or possibly burning off of the wire. Many operators produce bad effects by "bobbing" the lamp to raise or lower the light in relation to the lens. All lamps worthy of the name have adjustment screws by means of which any reasonable movement may



Viascope Rheostat, Fig. 4

be made, and **they should be used.** Watch your light closely by observing the picture effect. Remember that while any one can "twist a crank," it requires a good, careful man who understands his business to secure and maintain good, white, clear and strong projection light. But the careful, painstaking ignoramus may get better results than the careless man who is perfectly competent; and it is results on the curtain that count. The writer has seen pictures run by operators whom he knew were, so far as expert knowledge went, perfectly competent, with yellow shadows clear through 1,000 feet of film. This was the result of pure, unadulterated laziness or carelessness and utterly inexcusable from any point of view.

OILS.

Sewing machine or bicycle oil is excellent for machine bearings, but vaseline mixed with ground mica or graphite is best for gears.

THE RHEOSTAT.

In four cases out of five this most important adjunct to the light projection outfit is badly overworked. The office of this machine is to cut down the amperage—with the voltage it has nothing at all to do. The reason that a larger rheostat (one with more resistance) is required with 220 volts than with 110 is that 220 will force more amperes through a given resistance than will 110. Rheostat coils are made of German silver wire or some alloy of that metal. This metal offers high resistance to electric current and the longer the coils of a given size the current has to pass through the less current you will get. Some rheostats are made adjustable and some are not. With the latter you must have one just of size to allow the number of amperes you desire passage, and the dealer or maker must know the voltage and kind of current. With the first named you can set to suit yourself within the limit of its range. The current in forcing its way through generates heat by electrical friction, and if it is attempted to pass more current than the wire's capacity, the heating will be excessive. More current will be passed when it is first

turned on than when the machine has become heated. The rheostat may be compared to a water main. Suppose you desired to water your lawn and there was a six-inch main. If you opened the main full size you would be flooded. You therefore place a cap on its end, tap in a small pipe and get what you want. The rheostat corresponds to the cap on the water main. The best practice where there are several shows run in succession is to have two rheostats, changing each show, which may be done by throwing a single pole double throw knife switch by wiring as per Fig. 1.

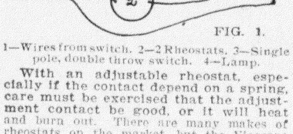


FIG. 1.

1—Wires from switch. 2—2 Rheostats. 3—Single pole, double throw switch. 4—Lamp.

With an adjustable rheostat, especially if the contact depend on a spring, care must be exercised that the adjustment contact be good, or it will heat and burn out. There are many makes of rheostats on the market, but the Viascope may be recommended as standard and thoroughly well made. Of adjustable rheostats that put out by the Viascope people seems to give general satisfaction.

The Viascope Mfg. Co. puts out an adjustable rheostat suitable for use under all conditions, delivering from twenty to sixty amperes. This machine has splendid contact mechanism, which is impossible to burn out.

In using high voltage current it is frequently found desirable to, instead of one very large rheostat, use two or more smaller ones in series, as per Fig. 2.

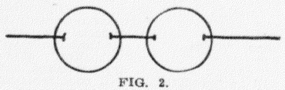


FIG. 2.

Other conditions at times render the

multiple connection (Fig. 3) desirable.

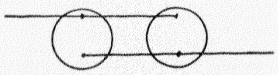
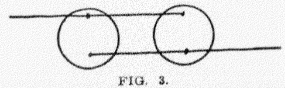


FIG. 3.

Taking one rheostat as a basis, series connecting reduces the current, while multiple increases it. For example: If one rheostat in circuit with a lamp gives 40 amperes, then connecting another of the same size in series would give but half as much, or 20 amperes, while if the additional rheostat were connected in multiple (Fig. 3), the resultant current would be double, or 80 amperes. A little study of Figs. 2 and 3 will enable you to understand why this is so. In emergency a barrel of water may be used as a rheostat. Fill the barrel with water, adding common salt enough to make a strong brine. Solder each wire end to a piece of gas pipe or bar of iron not less than an inch in diameter. Place them in the water, being **very careful they do not touch,** and place far enough apart to get the current you want. The water will heat and should be renewed occasionally. In emergency, when the rheostat is found too small to do the work, a bar of iron may be introduced into the circuit, its size and length depending, of course, on amount of additional resistance required. These are only emergency makeshifts, however, and not practical for permanent use. See to it that your rheostat binding post connections are clean and tight.

THE CARBONS.

There are many brands of carbons on the market, some very poor, and some excellent. It is not the purpose of the author to advertise any especial brand of goods, but to serve the purpose of this work, which is to give information and instruction to operators and managers, it becomes necessary to recommend certain articles like carbons. We therefore say that the brand known as "Electra," highest grade Nurenberg carbons, are standard and will be found to meet all requirements, under all conditions. The Electra is a carbon that will be found of good quality, free from faults, uniform in hardness and entirely satisfactory to the operator. The size depends on the current. For ordinary work where from 35 to 45 amperes of current is used, five-eighths cored above and same size solid below is, in the writer's judgment, best for direct current. Five-eighths and about one-half inch solid will fill the bill on alternating current. Be careful not to get your solid too hard or it will burn red. A medium hardness is best. For low voltage, weak current, smaller carbons should be used. If your light doesn't suit you, try other carbons. There is no rule that can cover all the different variations of current. Dont' be afraid to experiment until you find just the size and degree of hardness that suits your particular case; and don't be satisfied until you get the result you want. **Setting the carbons** is a matter on which there is a wide diversity of opinion among operators, but let it be clearly understood that practically **all available light** comes from the little cup-shaped depressions which form on the tips of both carbons with alternating current, and on the tip of the upper carbon with direct current. With this in mind, it will readily be seen that the object in view in setting carbons should be to get these depressions (called craters) to, as nearly as possible, squarely face the condenser and to get them to form of good shape and size. It is up to the individual operator to experiment on the angle of his carbons until the best possible result is attained. An angle that would produce a perfect crater in one case would be all wrong in another. In general, however, with direct current, the writer has found that setting the carbons in line with each other and angling the whole back about 25 per cent from the perpendicular, with the center of the tip of the upper carbon set from one-eighth to three-sixteenths of an inch back of the center of the tip of the lower, gives excellent results. though some prefer setting the lower straight up and down, angling the top one back. In any case, however, with direct current, always set multiple connection (Fig. 3) desirable.



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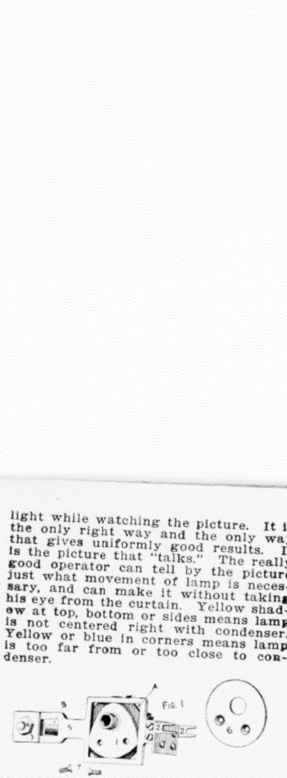
THE CONDENSER.

Condenser lenses are made of standard diameter, 4½ inches, but of different focus, and it is of prime importance that lenses of proper focus be used. In ordering lenses always give size of picture, both stereopticon and moving, and length of throw. The dealer can then supply you with condenser lenses of right focus. Condenser lenses will occasionally break, even with the most careful management, and there is wide divergence of opinion as to the why and wherefore. Many good, competent operators will assure you that breakage is caused by draft, but you will find others running with the whole back or top out of lamphouse and a big fan in the room and he doesn't break many lenses, either; which seems to prove that draft has little to do with it. The man who has a perfectly tight lamphouse and keeps his condenser casing tightly closed breaks just as many lenses as the other fellow, I have observed. The writer, after careful study of the matter, is of the opinion that breakage is due mainly to four causes: (a) The round (metal casing) which holds the lenses, too small, thus binding the lens when it expands under heat. Lenses should **never fit tight.** There should be one-sixteenth inch play when they are placed in the round and the **ring should not be screwed down tight.** The lenses should rattle when the case is shaken. This does not mean that they should be **too loose.** There is room here for exercise of a little judgment. But of the two (too loose or too tight) better far too loose. (b) Circulation of air in lamphouse and vent-holes in condenser casing closed, thus allowing circulation of air on one side and not on the other, producing unequal cooling and consequent liability of breakage. (c) Stoppage of screen over lamphouse by clogging with carbon ash. This produces excessive heat in lamphouse, with consequent abnormal heating of lenses. The perforated screen at top of lamphouse should be kept clean, as well as the one below (see "Lamphouse."). Some lamphouses have no screen. (d) Light too close to condenser, caused by lenses of wrong focus. This is disastrous to lenses, if you allow any flaming of the carbons. Get condenser lenses of right focus and lamp will be far enough away that blaze from flaming carbons will not strike the lens, also heat on condenser will not be so excessive. No matter what you do, however, you will break a condenser lens occasionally, and a stock of them should always be kept in the operating room.

THE SPOT.

The spot should show clear, brilliant white, be perfectly round and no larger than will cover the picture opening, with one-eighth inch or less to spare at corners. If you do not get a clear picture with such a spot, there is something radically wrong somewhere. Remember that **all white light that does not enter the picture opening is wasted.** With a spot half an inch larger than the gate opening fully half the available light is thrown away. Keep the spot as small as possible and still get a clear, white picture. **Never rely wholly on spot in trimming lamp. Watch the picture and learn to read results there. Watch the picture all the time** while running and trim lamp often. Don't be satisfied with yellow light. Clear, brilliant, white light is what is needed—**get it,** and don't stop trying until you do. With direct current when spot shows purple ring at edge, especially at top, lamp needs trimming. If spot shows oblong, your carbons are not in line sidewise. Line them at first stop. Carbons out of line sidewise won't give best light and are likely to "sputter." **Don't expect immediate permanent change in light when you change set of carbons.** The result comes from the carbon crater and current must have time to burn the change into carbon before you can tell just what it will be. Many inexperienced operators make the fatal mistake of continually fooling with the lamp, never waiting long enough to see what the result of a change may be. They twist one of the screws, and, because immediate result is not just what they desire, at once proceed to twist another. Of course, it goes without saying that they seldom or never have good light. Learn to adjust your

light while watching the picture. **It is the only right way and the only way that gives uniformly good results. It is the picture that "talks."** The really good operator can tell by the picture just what movement of lamp is necessary, and can make it without taking his eye from the curtain. Yellow shadow at top, bottom or sides means lamp is not centered right with condenser. Yellow or blue in corners means lamp is too far from or too close to condenser.



Single Cam Action of Viascope Special

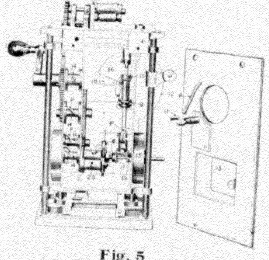


Fig. 5

1 Single cam.
2 Pins showing their position on carrier.
3 Guides for rear end of carrier plate.
4 Nuts for locking guides No. 3.
5 Carrier.
6 Washer to lock large cam and carrier together.
7 Screws to washer.
A. and B. Places to put oil when oiling cam.

Cut 2. View of interior mechanism.
9 Sleeve that holds shutter stationary with frame work and lens.
10 Mitre gear to shutter.
11 Fork that engages in sleeve (9).
12 Shutter guard outside of machine to protect shutter.
13 Door to get at movement.
14 Bearings. Can be removed and new ones inserted in their stead.
15 Fly wheels. One on each side of machine. Having two fly wheels makes the machine more steady, hence a steadier picture is shown.
16 Shutter.
17 Mitre gear on cam shaft. Used to set shutter. By loosening screws in gear No. 17, shutter can be turned in any position desired.
18 Framing plate, opening for picture.
19 Oil hole for oiling bearings near fly wheels which cannot be reached by oil tubes.
20 Oil hole for oiling slide block bearings.
P. Oil tubes extending from outside frame for oiling main bearings.

THE MACHINE.

There are several makes of excellent machines on the market, among which may be named the

The Viascope.
Edison Exhibition Model,
Powers No. 5,

These machines will be found well made, of good material, handy to operate, and to produce excellent results on the curtain. They will give satisfaction both to operator and owner under all conditions. In general, motion picture machines may be divided into two classes—sprocket and finger feed. It is not the purpose of this work to discuss the two mechanisms. Each has its advocates. In purchasing a machine the points to be carefully looked into and tested are: (a) Does it give a flickerless picture at normal speed? (b) What percentage of light is cut off by the shutter? (c) Is it constructed of good material in workmanlike manner? (d) Are its parts easy of adjustment and removal for replacement? (e) Are parts used by operator (frame-up lever, gate, etc.) handily arranged for quick manipulation? (f) Are its lenses of good quality and right for your work (see "Lenses")? Cheap

lenses are dear at any price. Always keep your machine well oiled (see "Oils") and in perfect adjustment; but remember that, while one drop of oil is very necessary, two is one too many for any moving picture machine bearing and will only run or be thrown off, creating a muss and possibly injuring the film. The first thing an operator should do on going on duty is to **clean the machine thoroughly** and oil it, examining carefully to see that there is no lost motion. Even slightly worn bearings should be **replaced immediately,** since all lost motion will show up on the curtain—you may be sure of that. While oiling, test the feed motion, and if the least bit loose, adjust then and there. **Run the feed** (intermittent sprocket) **just as close as it will run without binding,** but it must, at the same time, **work perfectly free.** The intermittent sprocket (feed motion) acts 16,000 times in running 1,000 feet of film, or about 1,056 times per minute (17½ times per second) at normal speed, so it will readily be seen there must be no binding. This high speed, however, serves to exaggerate the effect of the slightest lost motion. Pay very close attention to this adjustment if you desire good results on the curtain. Make a practice of **always before threading running a finger tip around the edge of the picture opening** to remove dust and dirt. A grain of dust half the size of the head of a pin on the edge of the picture opening will look like a cobblestone on the curtain. Before threading set your frame-up lever either clear up or down, as is most convenient. This gives full range of adjustment and is better than intermediate position. The gate tension springs are to hold the film steady and stop it instantly, without vibration, when the feed stops. The tension controls only the little strip of film immediately behind the gate, which, by reason of the loop, is to all intents and purposes detached, for the instant, from the rest of the film. The tension should be just tight enough to accomplish the desired result above named, and no more. Too tight a tension wears the film, back-plate and whole machine unnecessarily, and, so far as the machine is concerned, very rapidly. Aside from this, too tight a tension makes the machine run hard. Right here is one of the worst evils practiced by operators. The tension will, of course, if run tight enough, largely eliminate the evil result of lost motion in the intermittent sprocket or finger feed, but to accomplish this it must be very much too tight, and it is designed for no such purpose. This practice results in heavy wear on the whole machine. Keep your feed motion **in adjustment** and use the tension springs for the purpose they are intended for, and you will find that very little pressure will do the work.

THE LENSES.

Keep them clean! Be sure they are in exact focus. Spend a little time on this and don't attempt to do it from the operating room. Have some one work the adjusting screw for you and go yourself down into the darkened house and direct him. You may have a good picture, but the fraction of a turn of the adjustment screw may make it considerably better. When the focus is nearly right it is difficult to tell from a distance that it is **not exactly** correct. Select a scene with coarse grass, trees or shrubbery in it and bring out every blade or leaf distinctly. This applies to both motion and stereopticon. Lenses may best be cleaned with wood alcohol, polishing afterward with chamois. Take them apart occasionally and clean inside, but be very sure to get them together exactly as they were, or you will have trouble. The smaller stereopticon lenses do not give nearly so clear-cut or brilliant a picture as the larger diameters. A 2¼-inch stereopticon lens (2¼ inch diameter in the clear) is small enough. In using a small lens it is usually necessary to readjust the light in changing from stereopticon to motion picture, and vice versa, if good result is desired. This changing light is avoided by using the larger stereopticon lens.

THE PICTURE.

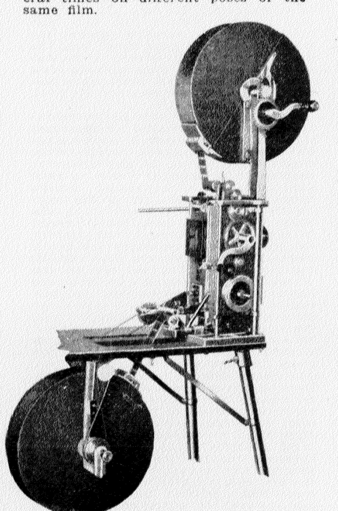
The picture should appear on the curtain its light parts white and brilliant. It should be of uniform color, save for the natural shades of the photography. While there are films which themselves contain, by reason of poor photographic work, shadows, as a general proposition shades of yellow at the top, bottom or sides shows lamp not centered right with condenser. A yellow picture all over usually indicates poor light. The operator should bend his most strenuous effort to getting a clear, brilliant, white light on every portion of the picture, and if his machine is properly adjusted, there is little more he can do save grind out the proper speed (see "Speed") to produce the best result the film will allow. **Remember this, though:** The good operator **keeps his eye constantly on the picture,** the rest of it, while machine is running, being largely a matter of hearing, since the practiced operator instantly detects the least false sound from either machine or lamp.

THE FILM.

Have a reel in the operating room that is prefectly true, the spring of which has been adjusted just right. **Never let this reel leave the operating room.** Don't have reel clamp spring too tight or it will tear the end of film when it pulls off at end of run. On receiving a film at once unwind it into box or on the take-up reel, as case may be, and, unless it be a brand new film, proceed as follows: Attach a tailpiece of blank film (a supply of which every operator should have) 12 to 16 inches long. Now, holding the edges between thumb and forefinger, with pressure enough to slightly cup the film, rewind very slowly on your own reel, examining every mend, cutting out all bad ones, re-cementing all loose ones and repairing all bad places in the track which later will be detected, usually, by pressure of the thumb and finger. If there be less than five feet of title, attach a leader of blank film 24 to 36 inches long. All this takes considerable time, but **it pays.** When you are through you should not have a single frame-up, after the start, in the entire run; nor should you have the least trouble with the film, though you run it for a week. An ounce of precaution is worth several pounds of cure. There are sixteen separate photographs on each foot of film, and as each of them **must stop dead still** in front of the picture-opening—dead still, without a particle of vibration, mind you—and as about 1,056 pictures are shown per minute, a film must perforce be in good condition to give good results on the curtain. It will pay you to put it in order. The film itself is 1⅜ inches wide by any length, and of somewhat varying thickness. It is of especially prepared celluloid, on one side of which has been placed the photograph emulsion, and this side should **always be toward the light.** Otherwise any printed matter will read backwards. The film is very inflammable and burns with intense heat and dense smoke, but not so rapidly as many imagine, save when a loose pile in the box. It is then like a pile of oil-soaked shavings. With powerful light it is unsafe to let it stop even for the space of one second without cutting the light from it. **Never under any circumstances let the machine stop with the light on the film** (See "What to Do in Case of Fire"). Never keep a film near the ceiling. Keep it near the floor when not in use, and if it is in a moist place it is better. A box with moisture-mat is best. Heat and dryness render a film brittle. Old films are likely to jump more than new, for the reason that they shrink and the track no longer fits perfectly on the sprocket. There is no remedy for this kind of "jumping."

Speed.

There is no hard and fast rule can be laid down regarding speed. It depends on the subject entirely, though, in general, it may be said that seventy feet per minute is about as fast as any film should be run under any conditions, and forty feet is as slow as is safe, this latter speed being only available with colored films, in which there is no rapid motion. The colored film or the plain one that is dark or dense may be run with much lower speed than one that is clear and light, since the "flicker" does not show on them nearly so much. In general films should be run at speed that will produce a minimum of flicker combined with natural motion in the figures. In a scene where a man falls or is knocked down, or an object is thrown, if the motion is too slow a totally absurd and ridiculous effect is produced, while, on the other hand, if the figure of a man walking is run at too rapid speed an equally grotesque effect is produced. Watch the picture closely and govern speed to suit the action of the film. It may be, and frequently is, found necessary to change speed several times on different poses of the same film.



Viascope with Upper and Lower Fireproof Magazine

STARTING THE MACHINE.

Always start the machine slowly. A little practice will enable you to pretty nearly center your light before it is thrown on the film, but you won't be likely to get it exactly right. This is where the blank leader comes in handy (see "The Film"), since it allows you to adjust light before the title comes on, thus leaving you with good light free to attend to frame-up the instant title appears on curtain. This is important if the title be short, as is frequently the case. It is attention to little details like this that marks the real operator from the would-be and the good show from the poor. Again I say, **always start machine very slowly, thus gaining time to get everything just right when picture appears on curtain.**

MENDING THE FILM.

Mending the film is a simple operation, but one that must be done just right. A wrongly made or poorly made mend invariably causes trouble. Film cement may be had of any dealer in supplies at 25 cents per bottle. A good plan is to get a very small artist's brush (cost 10 cents), one of the long-handle variety, and insert it in the bottle **through the cork,** being careful to shove handle through cork tightly, as film cement evaporates rapidly if exposed to air. Always keep cement tightly corked. Cut one end of film where it is to be joined, exactly on the line between two pictures and the other end, so that there will be a stub about one-eighth to three-sixteenths inch long beyond the last whole picture. Moisten this stub with tongue and with knife blade scrape photo emulsion off **clean.** Be sure to get it perfectly clean, as cement won't stick to emulsion. Now lightly scrape **back** of other end to remove all dirt or grease. Next, either with brush or by scraping from cork of bottle, apply cement to the stub where it was scraped. Apply cement liberally. Too much is better than not enough. Now **move fast** and join the two ends (being certain that the emulsion sides of both ends are on same side), so that the stub end is just covered by other end, **matching track holes perfectly.** This latter is very important, since they are your guide, and if they don't exactly match, your mend will be crooked. The best way is to match holes on one side, grasping over holes with thumb and finger, then match other side and press whole joint together firmly, rubbing between thumb and finger. Hold tight for ten seconds and the joint is done. If these directions are faithfully followed, the joint will be perfect and in running it through no frame-up will be required. There are several "film menders" on the market, but they are only a nuisance to the operator.

REWINDING.

This is a subject of utmost importance, since there is more actual damage done to films in rewinding than from all other causes put together. If the film is run into a box the rewinding should be **always done at very moderate speed,** since it may snarl at any instant, and if the speed is high there is more than likely to be a torn film, necessitating the loss of anywhere from one to a dozen pictures, thus injuring the film permanently. This means, if it be a rented film, that every operator who runs it afterward (and they may number hundreds) must be made to suffer for your ignorance or carelessness (see "Things to Think About"). **Always hold the edges of the film between the thumb and forefinger** while rewinding. By so doing you will be able to detect, by sense of touch, any break in the edges. There is much damage caused by holding the film flatwise between the fingers, since a multitude of very fine scratches are made on the emulsion, and, too, perspiration is likely to do damage. These fine scratches in time serve to render the film dull. **Avoid "pulling down"** tightly when rewinding. If reel is run at moderate speed there will be little necessity for pulling down (holding stationary while revolving reel to tighten the film roll), and it should by all means be avoided. Carelessness or ignorance in rewinding does more damage to films than all other causes put together. **Don't be a "would be";** do your work right and **be an operator.**

HOUSE LIGHTS.

Little details make a good show and lack of attention to them a poor one. The ceiling lights of the house, at least, should be controlled by a switch in the operating room as well as from below. In starting, light your lamp at least two minutes before your cue is due, so that it will be burning right. Do this with the hood cover or dowser down. When the cue comes raise the cover with the left hand, while with the right you pull the house lights. This makes a pretty effect, but is based on the supposition that you start with an illustrated song.

TINT SLIDES—HOW TO MAKE.

The operator who takes pride in doing the best possible work will provide himself with tint slides in about three shades each of red, yellow, green and blue. Rose, violet, etc., may be added at will. These tins should range from very light to medium, but none of them dark. Pretty effects may be had, too, with glass ground in geometrical patterns, such as used to be popular for front doors. Tinted glass is best since the colors are richer, but it is very hard to get light enough tints Tint slides may be made as follows: Get stereopticon photo plates and, **without exposing to light**, develop in usual manner, same as you would an exposed plate. This leaves a thin, perfectly transparent emulsion film on the glass, which will readily take color. Now, with some clear aniline dye of desired color (Diamond dyes are excellent), mix a rather weak solution and dip the plate in it, wiping the plain side clean. If not dark enough, dip again and again until desired tint is attained, letting it dry between each dipping. These slides may be used with good effect on some vaudeville turns and, occasionally, on portions of a film. A very light blue tint slide will brighten a yellow film considerably, but the tint must be **very light,** just a **bare tint.**

ANNOUNCEMENT SLIDES.

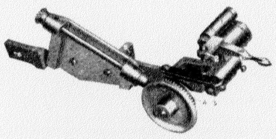
Very satisfactory announcement slides may be made by writing the desired matter on transparent gelatine paper (to be had very cheaply from dealers in stage lighting supplies), cut to slide size, with a typewriter and dusting the writing with dry bronze while wet. Place between glass, bind temporarily and use like any other slide.

The Viascope is high-class in every particular. It is high grade in the workmanship employed in its construction, in the material from which it is made (guaranteed absolutely against faulty material or workmanship), and in the result produced on the curtain.

Its mechanism is simple, free from vibration and positive in its action. There are no "stars" or "cams" requiring delicate adjustment, nor is there anything that can possibly get out of order or adjustment. The VIASCOPE is sent out from the factory fully adjusted and ready for business and all that is thereafter necessary is to give it proper lubrication. All parts are interchangeable and any bearing can be readily renewed. The picture produced is steady, flickerless and remarkably brilliant. The VIASCOPE is thoroughly fireproof and meets all underwriter's requirements.

DIRECTIONS FOR ADJUSTING THE VIASCOPE.

To Set Shutter: Open the door under projection lense and to the right, as you look in will be seen two small brass bevel gears meshing into each other. The one on the horizontal shaft has two set screws in its hub. Loosen these and the shutter may be revolved at will. Now thread a piece of film on the machine and frame it up properly. Now with the fly wheel slowly turn the machine in the direction it runs until the dividing line between pictures on film is exactly half way between top and bottom of picture opening or, to put it otherwise, until dividing line is central in picture opening. Now turn shutter-blade to right (as you look into picture opening) until center of shutter blade is opposite dividing line of picture and tighten screws in hub of bevel gear. The



Viascope Takeup Mechanism

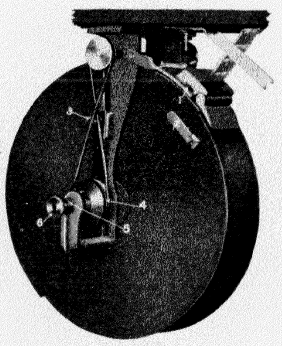


Fig. 6

Viascope Lower Magazine and Takeup Mechanism

metal shutter guard on left of machine should be removed to facilitate handling shutter and to enable one to mark the exact center of shutter blade. This method may be used in setting the shutter of any make of machine.

The Takeup: To thread the takeup, pass film between sprocket and idler, leaving a little slack between sprocket and gate. Carry end of film into magazine and attach to reel in regular manner. To adjust tension of takeup, tighten, or loosen, screw 3, figure 6 To rewind film into upper magazine, pull out spindle 6, figure 6, until it disengages from clutch 5, figure 6, when reel will be disconnected from takeup friction. To re-engage friction, press spindle 6 back into place.

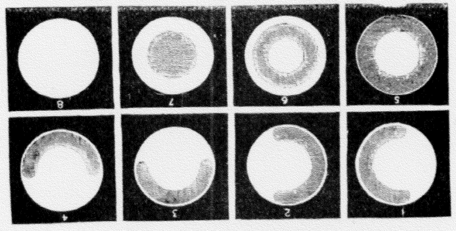
To Renew Pins (fingers): Remove small plate below picture opening and you will see pin plate, 2-2, figure 5, held in place by four screws. Remove these screws, substitute new plate and set screws up TIGHT.

The Tension Springs: Tension is provided by the broad, flat spring on face of film-gate. This spring bears, at its upper end, on two small pins which connect through the gate with the two long tension shoes on inside of gate. Tension is regulated by tightening or loosening thumb screw on face of gate. On the small pins on which main tension spring bears will be seen lock-nuts. In the course of time the face of the tension shoes may wear off so much that you can no longer get sufficient tension, in which case these nuts should be backed up just a little to allow the shoes to set further out.

Oiling: Oil holes are shown in figure 5.

Threading the Film: The VIASCOPE threads different from any other machine in that the "loop" is formed on the projection lense side of the upper sprocket. This is a very distinct advantage since in case of the intermittent motion failing to feed the film, by reason of missing sprocket holes or any other cause, the loop, instead of running down into the light, as it does with other machines in these cases, runs off on the projection lense side where it could not possibly be set on fire.

To thread the machine, set the "fingers" at bottom of stroke and engage sprocket holes on same. Draw film up in center of track and close gate. Pass film back UNDER sprocket and idler. Now hold idler back about half inch from sprocket and pass film over idler and back under sprocket (between idler and sprocket). Now while still holding idler half inch from sprocket, pull film tight against idler and engage teeth of sprocket with film perforations. Close idler and you are ready to run



When Shadows Appear on the Curtain as Above:

1. The Radiant, i.e., the crater is too far to the right;
2. The crater is to far too the left;
3. The crater is too high;
4. The crater is too low;
5. The crater is too far from the lamp condenser;
6-7. The crater is too near the condenser.
8. The crater is in the correct position.

Directions to Connect No. 5 Rheostat

Connected in series 2 and 3 with switch A open 110V. 10 amperes
Connected in series 2 and 3 with switch A open 220V. 20 amperes
Connected in series 1 and 2 with switch A open 110 V. 20 amperes
Connected in multiple 1 and 2 with switch A closed 110 V 40 amperes

Adjustable switches in front of Rheostat to operate by closing switch B in lug 4 you cut in 5 amperes
Adjustable switches in front of Rheostat to operate by closing switch B in lug 5 you cut in 10 amperes
Adjustable switches in front of Rheostat to operate by closing switch C in lug 6 you cut in 15 amperes
Adjustable switches in front of Rheostat to operate by closing switch C in lug 7 you cut in 20 amperes

No. 4 Viascope Adjustable Rheostat

For 110 direct current with switches B and C, open 20 amperes by closing switch B in lug 4 you get 25 amperes
For 110 direct current with switches B and C, open 20 amperes by closing switch B in lug 5 you get 30 amperes
For 110 direct current with switches B and C, open 20 amperes by closing switch C in lug 6 you get 35 amperes
For 110 direct current with switches B and C, open 20 amperes by closing switch C in lug 7 you get 40 amperes

The Viascope Adjustable Rheostat (see Fig. 4), yields to none in efficiency, durability or flexibility. The No. 4 is designed for direct current only. The No. 5 gives most excellent results on 110 volt alternating and may be used on 220 volt, but it is not recommended for 220 volt current unless two rheostais are used in multiple. The Viascope is made of No. 10 high-grade resistance wire, and is put up in thoroughly workmanlike manner. It is a high-class machine in every respect.

MEMORANDUM

RAYMOND M. SWANSEN
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